Exhibit 300: Capital Asset Plan and Business Case Summary

Part I: Summary Information And Justification (All Capital Assets)

Section A: Overview

1. Date of Submission: 2011-02-25

2. Agency: 026

3. Bureau: 00

4. Name of this Investment: NASA High-End Computing Capability (HECC)

5. Unique Project (Investment) Identifier (UPI): 026-00-01-04-01-1124-00

6. What kind of investment will this be in FY 2012?: Operations and Maintenance

- Planning
- Full Acquisition
- Operations and Maintenance
- Mixed Life Cycle
- Multi-Agency Collaboration

7. What was the first budget year this investment was submitted to OMB? FY2004

8.

a. **Provide a brief summary of the investment and justification, including a brief description of how this closes in part or in whole an identified agency performance gap, specific accomplishments expected by the budget year and the related benefit to the mission, and the primary beneficiary(ies) of the investment.**

The HECC Project supports the complex scientific and modeling & simulation requirements of NASA's Aeronautics Research, Exploration Systems, Science, and Space Operations Mission Directorates; NASA Engineering and Safety Center (NESC); and other key engineering and science objectives. HECC provides an integrated environment for modeling and simulation, including high-speed network access to cutting-edge high-end computing (HEC) platforms; mass storage; IT security; assistance with application porting, scaling, and optimization; data post-processing; visualization and data analysis; training; online documentation; and a 24x7x365 help desk. HECC provides a unique numerical simulation capability supporting NASA's most demanding science and engineering work by providing capacity, capability, and time-critical computing, ensuring all missions and support organizations can pursue their highest priority projects. The supercomputers denoted in this submission support >1,000 active users in the U.S. HECC completed a system expansion in July 2010, resulting in a petaflop-scale capability, with 14,336 Intel Xeon quad-core processors and 4,608 6-core processors; this is part of periodic expansion work that is a key part of the strategy to ensure HECC delivers resources suited to support the increasing computational requirements of NASA's unique missions. Modest growth of Pleiades is expected to continue during FY11, with a strong focus on improvements to the I/O infrastructure. In late FY11 or early FY12, test systems will likely be acquired to evaluate how the latest HEC technology can be harnessed to support the workload of NASA missions. The initial build-out of the new technology is planned for late FY12 targeting a doubling of the current compute capability. Unlike conventional projects, HECC does not have a completion date, since NASA's need for large-scale simulations is expected to increase for the foreseeable future.

b. **Provide any links to relevant websites that would be useful to gain additional information on the investment including links to GAO and IG reports.**

Title	Link
NASA Advanced Supercomputing Division website	http://www.nas.nasa.gov

9.

a. **Provide the date of the Agency's Executive/Investment Committee approval of this investment.** 2010-09-02

b. **Provide the date of the most recent or planned approved project charter.** 2009-11-02

10. Contact information?

a. **Program/Project Manager Name:** *
Phone Number: *
Email: *

b. **Business Function Owner Name (i.e. Executive Agent or Investment Owner):** Tsengdar Lee, Jerry Yan
Phone Number: *
Email: *

11. What project management qualifications does the Project Manager have? (choose only one per FAC-P/PM or DAWIA): Project manager has been validated according to FAC-P/PM or DAWIA criteria as qualified for this investment.

- Project manager has been validated according to FAC-P/PM or DAWIA criteria as qualified for this investment.
- Project manager qualifications according to FAC-P/PM or DAWIA criteria is under review for this investment.
- Project manager assigned to investment, but does not meet requirements according to FAC-P/PM or DAWIA criteria.
- Project manager assigned but qualification status review has not yet started.
- No project manager has yet been assigned to this investment.

Section B: Summary of Funding (Budget Authority for Capital Assets)

1.

Table I.B.1: Summary of Funding
(In millions of dollars)
(Estimates for BY+1 and beyond are for planning purposes only and do not represent budget decisions)

	PY-1 and earlier	PY 2010	CY 2011 (CY Continuing Resolution)	BY 2012	BY+1 2013	BY+2 2014	BY+3 2015	BY+4 and beyond	Total
Planning:	*	*	*	*	*	*	*	*	*
Acquisition:	*	*	*	*	*	*	*	*	*
Planning & Acquisition Government FTE Costs	*	*	*	*	*	*	*	*	*
Subtotal Planning & Acquisition(DME):	*	*	*	*	*	*	*	*	*
Operations & Maintenance:	*	*	*	*	*	*	*	*	*
Disposition Costs (optional):	*	*	*	*	*	*	*	*	*
Operations, Maintenance, Disposition Government FTE Costs	*	*	*	*	*	*	*	*	*
Subtotal O&M and Disposition Costs (SS):	*	*	*	*	*	*	*	*	*
TOTAL FTE Costs	*	*	*	*	*	*	*	*	*
TOTAL (not including FTE costs):	*	*	*	*	*	*	*	*	*
TOTAL (including FTE costs):	*	*	*	*	*	*	*	*	*
Number of FTE represented by	*	*	*	*	*	*	*	*	*

Table I.B.1: Summary of Funding
(In millions of dollars)
(Estimates for BY+1 and beyond are for planning purposes only and do not represent budget decisions)

	PY-1 and earlier	PY 2010	CY 2011 (CY Continuing Resolution)	BY 2012	BY+1 2013	BY+2 2014	BY+3 2015	BY+4 and beyond	Total
Costs:									

2. Insert the number of years covered in the column "PY-1 and earlier": 6

3. Insert the number of years covered in the column "BY+4 and beyond": *

4. If the summary of funding has changed from the FY 2011 President's Budget request, briefly explain those changes:
*

Section C: Acquisition/Contract Strategy (All Capital Assets)

1.

Table I.C.1 Contracts Table

Contract Status	Contracting Agency ID	Procurement Instrument Identifier (PIID)	Indefinite Delivery Vehicle (IDV) Reference ID	Solicitation ID	Alternative financing	EVM Required	Ultimate Contract Value (M)	Type of Contract/Task Order (Pricing)	Is the contract a Performance Based Service Acquisition (PBSA)?	Effective date	Actual or expected End Date of Contract/Task Order	Extent Competed	Short description of acquisition
Awarded	8000	NNA07CA29C			*	*	$597.0	Cost Plus Award Fee	Y	2007-08-01	2017-07-31	Y	NASA Supercomputing Support Services (NS3) supports the supercomputing services provided by NASA Advanced Supercomputing (NAS) Division, Ames Research Center (ARC), the National Aeronautics and Space Administration (NASA).

2. If earned value is not required or will not be a contract requirement for any of the contracts or task orders above, explain why:

*

3.

a. **Has an Acquisition Plan been developed? If yes, please answer the questions that follow** *
b. **Does the Acquisition Plan reflect the requirements of FAR Subpart 7.1** *
c. **Was the Acquisition Plan approved in accordance with agency requirements** *
d. **If "yes," enter the date of approval?** *
e. **Is the acquisition plan consistent with your agency Strategic Sustainability Performance Plan?** *
f. **Does the acquisition plan meet the requirements of EOs 13423 and 13514?** *
g. **If an Acquisition Plan has not been developed, provide a brief explanation.**
*

Part II: IT Capital Investments

Section A: General

1.

a. **Confirm that the IT Program/Project manager has the following competencies: configuration management, data management, information management, information resources strategy and planning, information systems/network security, IT architecture, IT performance assessment, infrastructure design, systems integration, systems life cycle, technology awareness, and capital planning and investment control.** yes

b. **If not, confirm that the PM has a development plan to achieve competencies either by direct experience or education.**

2. Describe the progress of evaluating cloud computing alternatives for service delivery to support this investment. hecc currently provides a private cloud platform as a service (paas) to deliver supercomputing resources and services to nasa scientists and engineers. the hecc meet all criteria as specified in nist's definition of cloud computing, dated 10/07/09.

3. Provide the date of the most recent or planned Quality Assurance Plan 2010-08-31

4.

a. **Provide the UPI of all other investments that have a significant dependency on the successful implementation of this investment.**

b. **If this investment is significantly dependent on the successful implementation of another investment(s), please provide the UPI(s).**

5. An Alternatives Analysis must be conducted for all Major Investments with Planning and Acquisition (DME) activities and evaluate the costs and benefits of at least three alternatives and the status quo. The details of the analysis must be available to OMB upon request. Provide the date of the most recent or planned alternatives analysis for this investment. 2010-06-29

6. Risks must be actively managed throughout the lifecycle of the investment. The Risk Management Plan and risk register must be available to OMB upon request. Provide the date that the risk register was last updated. 2010-05-18

Section B: Cost and Schedule Performance

Table II.B.1. Comparison of Actual Work Completed and Actual Costs to Current Approved Baseline:

Description of Activity	DME or SS	Agency EA Transition Plan Milestone Identifier	Planned Cost ($M)	Actual Cost ($M)	Planned Start Date	Actual Start Date	Planned Completion Date	Actual Completion Date	Planned Percent Complete	Actual Percent Complete
FY04 Deploy 10,000p Simulation System	DME	*	$26.0	$26.0	2004-06-15	2004-06-15	2004-09-30	2004-09-30	100.00%	100.00%
FY05 Upgrade 2,000p	DME	*	$2.0	$2.0	2004-10-01	2004-10-01	2005-04-01	2005-03-04	100.00%	100.00%
FY05 Begin upgrade 3 centers to 10Gb/sec	DME	*	$4.0	$4.0	2004-10-01	2004-10-01	2005-07-01	2005-07-01	100.00%	100.00%
FY05 Complete upgrade 3 centers to 10Gb/sec	DME	*	$2.0	$2.0	2005-07-02	2005-07-02	2005-09-30	2005-09-30	100.00%	100.00%
FY05 Deliver 65% System Avail and Integrated Simulation Environment	DME	*	$35.0	$35.0	2004-10-01	2004-10-01	2005-09-30	2005-09-30	100.00%	100.00%
FY06 Upgrade 2,000p	DME	*	$0.0	$0.0	2006-04-01	2006-04-01	2006-09-30	2006-09-30	0.00%	100.00%
FY06 Upgrade 3 centers to 10Gb/sec	DME	*	$0.0	$0.0	2006-07-01	2006-07-01	2006-09-30	2006-09-30	0.00%	100.00%
FY06 Deliver 72% System Avail and Integrated Simulation Environment	DME	*	$37.8	$37.8	2005-10-01	2005-10-01	2006-09-30	2006-09-30	100.00%	100.00%
FY07 Acquire Columbia Follow-On (CFO)	DME	*	$11.6	$13.2	2006-10-01	2006-10-01	2007-09-30	2007-09-30	100.00%	100.00%

Table II.B.1. Comparison of Actual Work Completed and Actual Costs to Current Approved Baseline:

Description of Activity	DME or SS	Agency EA Transition Plan Milestone Identifier	Planned Cost ($M)	Actual Cost ($M)	Planned Start Date	Actual Start Date	Planned Completion Date	Actual Completion Date	Planned Percent Complete	Actual Percent Complete
Hardware										
FY07 NAS Facility Upgrades to support CFO	DME	*	$4.0	$2.1	2006-10-01	2006-10-01	2007-09-30	2007-09-30	100.00%	100.00%
FY07 System S/W and Tools	DME	*	$9.1	$9.1	2006-10-01	2006-10-01	2007-09-30	2007-09-30	100.00%	100.00%
FY07 Secure Operations, Security, and User Support	SS	*	$9.9	$9.9	2006-10-01	2006-10-01	2007-09-30	2007-09-30	100.00%	100.00%
FY07 Improved Network Access to Columbia and CFO	DME	*	$4.4	$3.3	2006-10-01	2006-10-01	2007-09-30	2007-09-30	100.00%	100.00%
FY08 Acquire Columbia Follow-On (CFO) Hardware	DME	*	$12.5	$18.8	2007-10-01	2007-10-01	2008-09-30	2008-09-30	100.00%	100.00%
FY08 NAS Facility Upgrades to support CFO	DME	*	$2.3	$2.4	2007-10-01	2007-10-01	2008-09-30	2008-09-30	100.00%	100.00%
FY08 System S/W and Tools	DME	*	$9.1	$9.9	2007-10-01	2007-10-01	2008-09-30	2008-09-30	100.00%	100.00%
FY08 Secure Operations, Security, and User Support	SS	*	$10.8	$10.2	2007-10-01	2007-10-01	2008-09-30	2008-09-30	100.00%	100.00%
FY08 Improved Network Access to Columbia and CFO	DME	*	$3.1	$4.0	2007-10-01	2007-10-01	2008-09-30	2008-09-30	100.00%	100.00%
FY09 Acquire Columbia Follow-On (CFO) Hardware	DME	*	$13.1	$11.1	2008-10-01	2008-10-01	2009-09-30	2009-09-30	100.00%	100.00%
FY09 NAS	DME	*	$2.0	$1.6	2008-10-01	2008-10-01	2009-09-30	2009-09-30	100.00%	100.00%

Table II.B.1. Comparison of Actual Work Completed and Actual Costs to Current Approved Baseline:

Description of Activity	DME or SS	Agency EA Transition Plan Milestone Identifier	Planned Cost ($M)	Actual Cost ($M)	Planned Start Date	Actual Start Date	Planned Completion Date	Actual Completion Date	Planned Percent Complete	Actual Percent Complete
Facility Upgrades to support CFO										
FY09 System S/W and Tools	DME	*	$10.9	$12.4	2008-10-01	2008-10-01	2009-09-30	2009-09-30	100.00%	100.00%
FY09 Secure Operations, Security, and User Support	SS	*	$10.4	$8.4	2008-10-01	2008-10-01	2009-09-30	2009-09-30	100.00%	100.00%
FY09 Improved Network Access to Columbia and CFO	SS	*	$2.4	$2.0	2008-10-01	2008-10-01	2009-09-30	2009-09-30	100.00%	100.00%
FY10 Acquire NAS Technology Refresh (NTR) Hardware	DME	*	$14.9	$15.2	2009-10-01	2009-10-01	2010-09-30	2010-09-30	100.00%	100.00%
FY10 NAS Facility Upgrades to support NTR	DME	*	$1.1	$0.9	2009-10-01	2009-10-01	2010-09-30	2010-09-30	100.00%	100.00%
FY10 System S/W and Tools	DME	*	$11.3	$11.8	2009-10-01	2009-10-01	2010-09-30	2010-09-30	100.00%	100.00%
FY10 Secure Operations, Security, and User Support	SS	*	$11.8	$11.3	2009-10-01	2009-10-01	2010-09-30	2010-09-30	100.00%	100.00%
FY10 Improved Network Access to HECC Systems	SS	*	$2.8	$2.8	2009-10-01	2009-10-01	2010-09-30	2010-09-30	100.00%	100.00%
FY11 HECC Technology Refresh	SS	*	$11.3	$5.6	2010-10-01	2010-10-01	2011-09-30		47.55%	49.47%
FY11 Advanced System Software & Tools	SS	*	$8.1	$2.9	2010-10-01	2010-10-01	2011-09-30		36.75%	36.11%
FY11 Operations,	SS	*	$21.1	$8.5	2010-10-01	2010-10-01	2011-09-30		41.87%	40.29%

Table II.B.1. Comparison of Actual Work Completed and Actual Costs to Current Approved Baseline:

Description of Activity	DME or SS	Agency EA Transition Plan Milestone Identifier	Planned Cost ($M)	Actual Cost ($M)	Planned Start Date	Actual Start Date	Planned Completion Date	Actual Completion Date	Planned Percent Complete	Actual Percent Complete
Security & User Support										
FY12 HECC Technology Refresh	SS	*	*	*	2011-10-01	*	2012-09-30	*	*	*
FY13 NASA High-End Computing Capability Project	SS	*	*	*	2012-10-01	*	2013-09-30	*	*	*
FY14 NASA High-End Computing Capability Project	SS	*	*	*	2013-10-01	*	2014-09-30	*	*	*
FY15 NASA High-End Computing Capability Project	SS	*	*	*	2014-10-01	*	2015-09-30	*	*	*
FY16 NASA High-End Computing Capability Project	SS	*	*	*	2015-10-01	*	2016-09-30	*	*	*
FY12 Advanced System Software & Tools	SS	*	*	*	2011-10-01	*	2012-09-30	*	*	*
FY12 Operations, Security & User Support	SS	*	*	*	2011-10-01	*	2012-09-30	*	*	*

2. If the investment cost, schedule, or performance variances are not within 10 percent of the current baseline, provide a complete analysis of the reasons for the variances, the corrective actions to be taken, and the most likely estimate at completion. The investment is within 10 percent of the current baseline.

3. For mixed lifecycle or operations and maintenance investments an Operational Analysis must be performed annually. Operational analysis may identify the need to redesign or modify an asset by identifying previously undetected faults in design, construction, or installation/integration, highlighting whether actual operation and maintenance costs vary significantly from budgeted costs, or documenting that the asset is failing to meet program requirements. The details of the analysis must be available to OMB upon request. Insert the date of the most recent or planned operational analysis.

4. Did the Operational analysis cover all 4 areas of analysis: Customer Results, Strategic and Business Results, Financial Performance, and Innovation?

Section C: Financial Management Systems

Table II.C.1: Financial Management Systems

System(s) Name	System acronym	Type of Financial System	BY Funding
*	*	*	*

Section D: Multi-Agency Collaboration Oversight (For Multi-Agency Collaborations only)

Table II.D.1. Customer Table:

Customer Agency	Joint exhibit approval date

NONE

Table II.D.2. Shared Service Providers

Shared Service Provider (Agency)	Shared Service Asset Title	Shared Service Provider Exhibit 53 UPI (BY 2011)
*	*	*

Table II.D.3. For IT Investments, Partner Funding Strategies ($millions):

Partner Agency	Partner exhibit 53 UPI (BY 2012)	CY Monetary Contribution	CY “In-Kind” Contribution	CY Fee-for-Service	BY Monetary Contribution	BY “In-Kind” Contribution	BY Fee-for-Service

NONE

Table II.D.4. Legacy Systems Being Replaced

Name of the Legacy Investment of Systems	Current UPI	Date of the System Retirement
*	*	*

Section E: Performance Information

Table I.E.1a. Performance Metric Attributes

Measurement Area (For IT Assets)	Measurement Grouping (For IT Assets)	Measurement Indicator	Reporting Frequency	Unit of Measure	Performance Measure Direction	Baseline	Year Baseline Established for this measure (Origination Date)
Mission and Business Results	Space Exploration and Innovation	Computing capability (Standard Billing Units) to support NASA mission requirements	annual	Standard Billing Units	Increase	325 million Standard Billing Units	2010-08-23

Fiscal Year	Target	Actual Results	Target "Met" or "Not Met"	Last Updated
2010	Increase capability to 500 million Standard Billing Units	Delivered 588 million Standard Billing Units	Met	2010-09-17
2011	Increase capability to 650 million SBUs	TBD	Not Due	2010-09-17
2012	Increase capability to 1.2 billion SBUs	TBD	Not Due	2010-09-17

Measurement Area (For IT Assets)	Measurement Grouping (For IT Assets)	Measurement Indicator	Reporting Frequency	Unit of Measure	Performance Measure Direction	Baseline	Year Baseline Established for this measure (Origination Date)
Technology	Overall Costs	Cost effectiveness as measured by the computing capability delivered by the High-End Computing Capabilities Project	annual	Dollars per System Billing Unit	Increase	16 cents per SBU	2010-08-23

Fiscal Year	Target	Actual Results	Target "Met" or "Not Met"	Last Updated
2010	10 cents per System Billing Unit	8 cents per System Billing Unit	Met	2010-09-17
2011	$0.08 per System Billing Unit	TBD	Not Due	2010-09-17
2012	$0.05 per System Billing Unit	TBD	Not Due	2010-09-17

Processes and Activities	Security	Operate & maintain	annual	Percentage of controls	Increase	100% Information	2010-08-23

		HECC security systems, ensuring 100% compliance with NASA & NIST requirements; maintain awareness of threats & risks; assess security protection architectures; deliver Security Team Services; conduct R&D in IT security as needed		that pass from the NIST SP 800-53 Controls that must be tested annually		Technology security compliance	

Fiscal Year	Target	Actual Results	Target "Met" or "Not Met"	Last Updated
2010	100% Information Technology Security Compliance	100% Information Technology Security Compliance	Met	2010-09-17
2011	100%	TBD	Not Due	2010-09-17
2012	100%	TBD	Not Due	2010-09-17

Customer Results	Customer Impact or Burden	Users provided with improved productivity due to porting and optimization assistance	annual	Number of users	Increase	25 users	2010-08-23

Fiscal Year	Target	Actual Results	Target "Met" or "Not Met"	Last Updated
2010	30 users	32 users	Met	2010-09-17
2011	35 users	TBD	Not Due	2010-09-17
2012	35 users	TBD	Not Due	2010-09-17

* - Indicates data is redacted.